

**A METHOD AND SYSTEM FOR MAKING DOCUMENT OBJECTS  
AVAILABLE TO USERS OF A NETWORK**

This application is a continuation-in-part of U.S. Application Serial Number 10/050,515, filed January 18, 2002, entitled A SYSTEM AND METHOD FOR COLLECTING, STORING, MANAGING AND PROVIDING CATEGORIZED INFORMATION RELATED TO A DOCUMENT OBJECT, which claims priority from U.S. Provisional Application No. 60,273,520, filed March 7, 2001, entitled SYSTEM AND METHOD FOR COLLECTING AND PROVIDING USERS WITH CATEGORIZED INFORMATION RELATED TO AN OPEN DOCUMENT and U.S. Provisional Application No. 60/282,470, filed April 10, 2001, entitled SYSTEM AND METHOD FOR COLLECTING, STORING, MANAGING AND PROVIDING TO NETWORK USERS CATEGORIZED INFORMATION RELATED TO AN OPEN DOCUMENT.

This application also claims priority from U.S. Provisional Application No. 60,273,520, filed March 7, 2001, entitled SYSTEM AND METHOD FOR COLLECTING AND PROVIDING USERS WITH CATEGORIZED INFORMATION RELATED TO AN OPEN DOCUMENT and U.S. Provisional Application No. 60/282,470, filed April 10, 2001, entitled SYSTEM AND METHOD FOR COLLECTING, STORING, MANAGING AND PROVIDING TO NETWORK USERS CATEGORIZED INFORMATION RELATED TO AN OPEN DOCUMENT, which are both hereby incorporated by reference.

The following other continuation-in-part application filed concurrently herewith, also claiming priority from the above-referenced patent application, is incorporated herein by reference entitled, A FRAMEWORK FOR MANAGING DOCUMENT OBJECTS STORED ON A NETWORK, by inventor Thomas Layne Bascom, et al.

**TECHNICAL FIELD**

The technical field is relating documents on computer networks and storing, indexing and presenting those relationships to network users.

**BACKGROUND**

Networks connecting many computers offer users access to a wide variety of information. Computers are exceptional devices for storing, sorting and relating large amounts of information. Information is stored on computers and networked computing and storage devices as documents or objects, together referred to as document objects. Such document objects may contain any form of information, from text documents and

1 articles, financial data, statistical information, electronic mail, images and photos, music,  
2 animation, and even motion pictures.

3 The Internet, as a network of interconnected networks, offers users access to an  
4 even broader collection of information - the Worldwide Web (the "Web"). On the Web,  
5 publishers offer information for educational, recreational, and commercial purposes. The  
6 Internet, and it's predominant Web form, is organized and accessed by assigning  
7 document objects an address, or Uniform Resource Locator ("URL"). These URLs define  
8 the transfer protocol for and location of each individual document object on the Internet,  
9 or other network, including the Internetworking Protocol ("IP") address of the host  
10 computer system of the document object.

11 A URL may also represent an address including instructions for accessing a  
12 document object that is generated on request by retrieving and rendering for presentation  
13 organized information in response to information supplied by the requestor. When the  
14 URL contains enough information to recreate the document object generated in such a  
15 manner, that document object can be recreated for others using the URL. A URL may  
16 also include information, sometimes called a bookmark, with information allowing the  
17 rendering tool to present or highlight a location in the document upon opening the  
18 document.

19 Users accessing computer networks and the Internet are generally required to  
20 perform their own searches across the networks for the information, stored as document  
21 objects, that they desire or need. As the amount of information available on computer  
22 networks, and on the Internet in particular, grows exponentially, existing search and  
23 information location techniques become increasingly less effective. Existing Internet  
24 search techniques often yield too many seemingly related references which are not, in  
25 fact, truly useful to the user. The usefulness of traditional Internet search and indexing  
26 systems is actually decreasing as the number of documents on the Internet explodes.

27 Existing search, categorization, and retrieval techniques for document objects  
28 stored on computer networks, while generally executed at the high speeds of modern  
29 computer systems, are increasingly imprecise and often much too broad, as well as time  
30 and labor intensive, owing to the explosion of information being added to those networks.

31 A need exists to enhance the network user's information browsing experience. A  
32 need exists to provide network users with information relevant to the individual document  
33 object they are accessing and provide that information in a context of value to them by  
34 relating the document object they are accessing to link references to other document

1 objects within a specific context. Such other document objects may or may not be offered  
2 by the publisher of the document object currently accessed. A need exists to provide  
3 network users with information relevant to the specific information the user may be  
4 searching for and relevant to the user's immediate personal, professional, geographic and  
5 other interests.

6 A need exists for entities or groups to be able to communicate information to their  
7 employees or members as those employees or members access document objects on a  
8 network, and to enable those employees or members to view content deemed important to  
9 the entities or groups. A need further exists for publishers of content on the Internet to be  
10 able to personalize content presented to Internet users without requiring the establishment  
11 of a personal relationship between the user and the content publisher. A need exists to  
12 enable the collection of the search experiences of a group of users and share that  
13 experience with other users of networked information devices.

14 A need exists for creators of document object content to be able to distribute that  
15 content to users of a network with similar interests by means other than through a  
16 traditional website hosting service, Internet portal or by placement with a web search  
17 engine.

## 18 **SUMMARY**

19 The systems, apparatus and methods of the present invention (hereinafter  
20 "Linkspace") incorporate and provide many improvements on existing methods for  
21 publishing, distributing, relating and searching document objects on computer networks,  
22 including the Internet.

23 Linkspace operates to provide many beneficial improvements in searching,  
24 identifying and publishing information over computer networks.

25 Linkspace permits a user of a computer network or the Internet to establish  
26 relationships between document objects located on the network or the Internet. Those  
27 relationships may comprise link relationships and link references and are maintained by  
28 Linkspace in one or more link directories. The contents of link directories may be  
29 organized, categorized, sorted, filtered and presented in groupings based on various  
30 criteria relating to, among other things, user interests and their attributes, the types of  
31 document objects and the nature of the content of those document objects. Linkspace  
32 allows a network user to be presented with a selection of links to document objects  
33 related to the document object the user is currently accessing based upon the URL of the

1 current document object, and link relationships created by the user and other users of the  
2 network stored in the link directories.

3 When a network user equipped with Linkspace identifies and locates a first  
4 document object on the network that is of interest to her, she may initiate one method of  
5 the present invention to mark the location, through its URL, as a start point of a link  
6 relationship. When she accesses a second document object on the network that she  
7 considers relevant to the first document object, she initiates another step of one method of  
8 the invention to mark the second document object as an end point of the link relationship.  
9 Upon marking the second document object as the end point, the link relationship is  
10 created and stored on a link directory selected to store similar link relationships. When a  
11 second network user equipped with Linkspace, and with access to the link directory,  
12 accesses the first document object, he is then presented with a link to the second  
13 document object as a relevant document object that may be of interest to him. Likewise,  
14 if the second network user accesses the second document object, he may then be  
15 presented with a link to the first document object as a relevant document object that may  
16 be of interest to him.

17 Linkspace consists primarily of a system and method for creating and publishing  
18 link relationships, a system and method for storing and managing link relationships in  
19 link directories, and a system and method for presenting a network user with links related  
20 by link relationships to the document object the user is currently accessing.

21 In one respect what is described is a method for for creating access to a first  
22 document object to users of a network, wherein the first document object is not available  
23 or not easily accessible by users of the network, the method comprising:

24 allowing a first user of the network to create a link relationship between the first  
25 document object and a second document object that is available to other users of the  
26 network;

27 storing the link relationship in one or more link directories;

28 making the first document object accessible to users of the network;

29 providing users of the network access to the link relationship; and

30 enabling users of the network to use the link relationship to retrieve the first  
31 document object, wherein the link relationship provides users of the network with  
32 information relating the first document object to the second document object accessed by  
33 users of the network.

1 In yet another respect, what is described is a computer readable medium on which  
2 is embedded a program. The embedded program comprises modules that execute the  
3 above method.

4 Those skilled in the art will appreciate these and other advantages and benefits of  
5 various embodiments of the invention upon reading the following detailed description of  
6 a preferred embodiment with reference to the below-listed drawings.

## 7 **DESCRIPTION OF THE DRAWINGS**

8 The detailed description will refer to the following drawings, wherein like  
9 numerals refer to like elements, and wherein:

10 Figure 1 is a diagram showing a system according to one embodiment of the  
11 invention;

12 Figure 2 is a diagram showing a client device which is Linkspace-enabled and its  
13 interaction with other hardware and software;

14 Figure 3a is a diagram showing the components of a server which is Linkspace-  
15 enabled and its interaction with other hardware and software;

16 Figure 3b is a diagram showing more detail of one embodiment of a user data  
17 store from Figure 3a;

18 Figure 4a is a diagram illustrating one embodiment of a link directory according  
19 to one embodiment of the invention;

20 Figure 4b is a diagram illustrating another embodiment of a link directory  
21 according to one embodiment of the invention;

22 Figure 5 is a diagram showing one embodiment of the invention implemented on  
23 public, private or closed computer networks;

24 Figure 6 is a flowchart illustrating a method for enabling users of a network to  
25 create, store, and provide access to relationships among document objects stored on the  
26 network according to one embodiment of the invention;

27 Figure 7 is a flowchart illustrating a method for identifying link relationships  
28 between document objects according to one embodiment of the invention;

29 Figure 8 is a flowchart illustrating a method for publishing link relationships  
30 between document objects according to one embodiment of the invention;

31 Figure 9 is one example screen view of a user interface for a relate links dialog  
32 box according to one embodiment of the invention;

33 Figure 10 is an example of a screen view for a client user interface according to  
34 one embodiment of the invention;

1 Figure 11 is one example screen view of a user interface for a publish document  
2 object dialog box according to one embodiment of the invention;

3 Figure 12 is one example screen view of a user interface for a submit comments  
4 dialog box according to one embodiment of the invention;

5 Figure 13 is a flowchart illustrating a method for publishing a first document  
6 object to users of a network, wherein the first document object is not previously available  
7 to users of the network according to one embodiment of the invention;

8 Figure 14 is one example screen view of a user interface for a target published  
9 document objects dialog box; and

10 Figure 15 is one example screen view of a user interface for a domain  
11 representation dialog box.

## 12 **DETAILED DESCRIPTION**

13 Figure 1 shows one embodiment of a system 100 for collecting, storing, managing  
14 and providing to network users categorized information related to an open document  
15 object. A document object may contain any form of information, including text  
16 documents and articles, financial data, statistical information, electronic mail, images and  
17 photos, music, voice data, animation, and even motion pictures, or may refer to a portion  
18 thereof. A document object may be dynamically created or formed. The system 100  
19 includes a network 10, such as the Internet or other network of interconnected computers  
20 or a combination of networks and the Internet; one or more Linkspace-enabled client  
21 devices 20; one or more Linkspace-enabled servers 30, one or more first document  
22 objects 40; one or more second document objects 50; one or more link references 42 and  
23 52, corresponding to the first document objects 40 and the second document objects 50  
24 respectively; and one or more link relationships 45. The system 100 may also include one  
25 or more links 41 and 51 pointing to the first document objects 40 and second document  
26 objects 50 respectively. The client devices 20, as well as the server 30, are preferably  
27 Linkspace-enabled. The client device 20 may comprise a computer or other digital  
28 information device running software enabled by the present invention to create, filter, sort  
29 and display the link references 42, 52, and the link relationships 45. The server 30 may  
30 comprise a server computer or other digital information device running software enabling  
31 the present invention to store, index, search, filter, sort and transmit the link references  
32 42, 52, and the link relationships 45 to client devices 20. The server 30 further comprises  
33 one or more link directories 35 for storing and indexing information regarding the link

relationships 45 and link references 42 and 52 developed by the client devices 20 with respect to the one or more first documents 40 and second documents 50.

The link reference 42, 52 comprises a pointer to one document object 40, 50 on the network 10 and attributes associated with that document object 40, 50. The link relationship 45 comprises two pointers, one each to the first document object 40 and to the second document object 50, and attributes describing characteristics of the relationship between the two document objects 40, 50 related by the link relationship 45. The pointers included in a link relationship 45 may be comprised of pointers to a link reference 42, 52. The link relationship 45 establishes a meaningful relationship between two document objects 40, 50, whereas the locations of the document objects 40, 50 may be maintained within the Linkspace system 100 by means of the link references 42, 52.

The system 100 shown in figure 1 operates to create and store link relationships 45. The system 100 creates and stores link relationships 45 between a first document object 40 and a second document object 50, preferably on one or more servers 30 in one or more link directories 35 in the manner described as follows. The client device 20 is enabled by means of software or other devices to request, access and display document objects on the network 10. When the user of a client device 20 identifies one first document object 40 of interest to her that she wishes to associate with a second document object 50, she utilizes the software running on the Linkspace-enabled client device 20 to create a link relationship 45 between the first document object 40 and the second document object 50. This link relationship 45 is then stored on the server 30 in a link directory 35.

In an alternate embodiment, the system 100 may operate to perform the functions described above, including the creation of link relationships 45 and link references 42, 52, the storing of link relationships 45 and link references 42, 52, and providing access to and retrieval of link relationships 45 and link references 42, 52, by means of automated procedures requiring little or no user interaction.

When a client device 20 later requests and accesses a first document object 40 for which the server 30 has stored an associated link relationship 45 in one or more link directories 35, the server 30 delivers to the client device 20 the link references 42 and the link relationships 45, along with contextual information, or attributes, associated with the link references 42 and the link relationships 45. The client device 20 then displays to the user of the client device 20 the existence of a link relationship 45 between the first document object 40 being accessed by the client device 20 and the second document

1 object 50. This enables the user of the client device 20 to be made aware of the second  
2 document object 50, the context of the second document object 50, and the context of the  
3 relationship between the second document object 50 and the first document object 40 as  
4 that relationship may be of interest to the user of the client device 20 while viewing the  
5 first document object 40.

6 Each link relationship 45 may also operate in the reverse direction. In this  
7 manner, when a user of the client device 20 is accessing the second document object 50  
8 for which an associated link relationship 45 is stored in the one or more link directories  
9 35 on the server 30, the server 30 then transmits the link references 42 and the link  
10 relationships 45, with contextual information, to the client device 20. This enables  
11 display of the availability of the related first document object 40 to the user of the client  
12 device 20 with the context of the first document object 40, and within the context of its  
13 relationship to the displayed second document object 50.

14 While the system 100 is generally described as having enabling software resident  
15 on the client device 20 and on the server 30, various other software configurations are  
16 possible, including having all of the software resident at either the server 30 (making the  
17 client device 20 essentially a "dumb terminal") or at the client device 20 (making the  
18 client device 20 essentially perform server functions), or various software sharing  
19 arrangements. For example, the client device 20 may include the one or more link  
20 directories 35, a communications module (described later in reference to Figure 3a), and a  
21 user data store that may maintain information regarding authorized users of the client  
22 device 20 (described later in reference to Figures 2, 3a, and 3b).

23 Figure 2 is a diagram showing an example of the components of a Linkspace-  
24 enabled client device 20 and its interaction with other software and hardware. The client  
25 device 20 preferably includes a rendering tool 210, such as a web page browser like  
26 Microsoft® Internet Explorer, for rendering document objects located on the network 10  
27 and displaying those document objects to users of the client device 20; a client tool 220,  
28 for allowing the user of the client device 20 to create and access link relationships 45  
29 between document objects; and a network access tool 240, such as a TCP/IP stack or  
30 other interface, for allowing software modules on the client device 20 to connect to and  
31 communicate with other devices and document objects on the network 10. The client  
32 device 20 operates primarily to create and present link relationships 45 to users.



1 The rendering tool 210 may store a document object URL address 215 for  
2 referring to the document object currently being accessed and rendered by the rendering  
3 tool 210. The rendering tool 210 may also include a Graphic User Interface ("GUI")  
4 display 218, or other type of display, for displaying the document objects accessed and  
5 rendered by the rendering tool 210. In alternate embodiments of the invention, the client  
6 device 20 may include more than one rendering tool 210 enabling the user of the client  
7 device 20 to access multiple document objects.

8 The client tool 220 may include a client GUI display 225, or other display  
9 software and hardware, for displaying link references 42, 52 and link relationships 45 to  
10 the user of the client device 20. Typically, the displayed link references 42, 52 and link  
11 relationships 45 would be those link references 42, 52 and link relationships 45 relevant  
12 to the document object currently being rendered and displayed by the rendering tool 210  
13 (as determined by the document object URL address 215 in the rendering tool 210). The  
14 client tool 220 may also include Linkspace user profile data 230 for storing information  
15 about the user of the client device 20, the link directories 35 the user may have access to,  
16 and the attributes of link references 42, 52, and attributes of link relationships 45 that the  
17 user may be interested in. The Linkspace user profile data 230 may also or alternatively  
18 be stored on the one or more servers 30, along with the Linkspace user profile data 230 of  
19 all other users of the system 100.

20 An example of how the client device 20 operates to create and present link  
21 relationships 45 to users of the client device 20 follows. While the network access tool  
22 240 is active and placing the client device 20 in communication with the network 10, the  
23 user enables the rendering tool 210 and the client tool 220. The user may then request  
24 and access document objects stored on the network 10 by means of the rendering tool  
25 210. Through the GUI display 218, the users enters or otherwise selects a document  
26 object URL address 215 associated with the first document object 40 of interest to the  
27 user. The client tool 220 connects to and uses the rendering tool 210 and accesses the  
28 document object URL address 215 associated with the first document object 40. The  
29 client tool 220 then establishes contact with the server 30 and passes to the server 30 the  
30 stored document object URL address 215 associated with the first document object 40,  
31 along with any relevant information that may come from the Linkspace user profile data  
32 230. The connection to the server 30 may be initiated through the network access tool  
33 240 or by other means not utilizing the network access tool 240.

1 The Linkspace-enabled server 30 searches the link directories 35 for any URLs in  
2 the link references 42, 52 matching, or similar to, the document object URL address 215.  
3 After searching, the server 30 retrieves the one or more link relationships 45 that include  
4 the document object URL address 215. Prior to searching, the URLs may be stripped of  
5 any information not relevant to the location of the document object 40, 50 on the network  
6 10. Such information not relevant to the location of the document object 40, 50 may  
7 include query strings or other data attached to URLs for tracking or other purposes.

8 The server 30 then determines the link references 42, 52 which may be of interest  
9 to the user of the client device 20 by filtering the retrieved link references 42, 52 using the  
10 Linkspace user profile data 230 and the attributes assigned to the link references 42, 52  
11 and to the link relationships 45. The filtering of link references 42, 52 and link  
12 relationships 45 may be accomplished by one of several methods of filtering data  
13 including matching, character and Boolean comparing, and other data comparison and  
14 filtering methods. The server 30 then transmits to the client tool 220 the filtered link  
15 references 42, 52 included in the one or more link relationships 45. The client tool 220  
16 presents the transmitted link references 42, 52 within the context established by the link  
17 relationships 45 by means of the client GUI display 225.

18 To create a new link relationship 45, the user of the client device 20 must select a  
19 first document object 40 to begin the link relationship, a second document object 50 to  
20 complete the link relationship 45, and assign attributes to the link references 42, 52 and  
21 the link relationship 45 between the two document objects 40, 50. To select a first  
22 document object 40 to begin the new link relationship 45, the user interacts with the client  
23 GUI display 225 to activate a function of the client tool 220 to capture the document  
24 object URL address 215 associated with the first document object 40. To select a second  
25 document object 50 to complete the new link relationship 45, the user may interact with  
26 the GUI display 218 of the rendering tool 210 to request, access and display the second  
27 document object 50. The user may then interact with the client GUI display 225 again to  
28 activate a further function of the client tool 220 to capture the document object URL  
29 address 215 associated with the second document object 50, completing the selection of  
30 document objects 40, 50 participating in the new link relationship 45. Once the two  
31 document objects 40, 50 are established, attributes of the link references 42, 52 and the  
32 new link relationship 45 may be assigned.

33 The user may select or otherwise specify attributes associated with the link  
34 references 42, 52 and link relationship 45. These attributes aid in categorizing, sorting or

1 filtering the link references 42, 52 and the link relationship 45 in the link directories 35  
2 for delivery to other client devices 20. The attributes may be, for example, descriptive,  
3 temporal, spatial, or quantitative in nature, i.e., describe the link reference in terms of who  
4 or what, when, where, or how much. One such attribute (not shown) may be a plain  
5 language name for the link reference 42, 52, determined and entered by the user to  
6 describe the link reference in terms more useful to users of the system 100 than the  
7 document object URL address 215. Other examples of attributes may include description  
8 of the content of either of the document objects 40, 50 related by the link relationship 45,  
9 wherein that content may be described to include a product review, news article, product  
10 information page, competitor's product information, or product order forms, among other  
11 types of content.

12 Normally, upon completion of the endpoint capturing and attribute assignment  
13 functions, the client tool 220 connects to the server 30 to store the link references and the  
14 new link relationship 45 in the appropriate link directory 35. Generally, the new link  
15 relationship 45 is then made available to other users. Typically, other client devices 20  
16 who have access to the server 30 and are assigned access privileges on the link directory  
17 35 in which the new link relationship 45 has been stored are given access to the new link  
18 relationship 45.

19 Furthermore, if the user of the client device 20 determines that there is a  
20 relationship that is not already described by the transmitted link relationships 45 between  
21 the currently accessed document object 40 and a second document object 50, the user  
22 may proceed to create and publish a new link relationship 45 between the first document  
23 object 40 (currently accessed and displayed by the rendering tool 210) and the second  
24 document object 50. This may be accomplished without displaying the second document  
25 object 50.

26 Figure 3a is a diagram showing the components of the Linkspace-enabled server  
27 30 and its interaction with other hardware and software. The server 30 includes a first  
28 link directory 35, a user data store 370, and a server manager 380. The server 30 may  
29 also include a second link directory 310 and one or more Nth link directories 320. The  
30 server manager 380 coordinates communications between the other components of the  
31 server 30. The server manager 380 also coordinates communications with outside  
32 objects, including the one or more client devices 20. The server manager 380 also  
33 performs the function of locating appropriate link directories 35, 310, 320 for the user to  
34 participate in based upon a document object presently displayed on the client device 20.

1 The user of the client device 20 may request that the server manager 380 look in all link  
2 directories 35, 310, 320 across the system 100, regardless of whether the user has an  
3 affiliation with the specific link directory 35, 310, 320 (which may be set in the user's  
4 Linkspace user profile data 230), for the URL of the document object the user is currently  
5 accessing with the client device 20. The user data store 370 stores identification and user  
6 profile data regarding users authorized to access the server 30, which of the several link  
7 directories 35, 310, and 320 those users are permitted access to, and which attribute  
8 preferences the users have for each of the link directories 35, 310, 320. In alternate  
9 embodiments of the invention, portions of the information maintained in the user data  
10 store 370 may be stored in the link directories 35, 310, 320.

11 Figure 3a also shows one or more alternate Linkspace-enabled servers 350 that  
12 may reside on the network 10. In alternate embodiments of the system of the invention,  
13 the one or more alternate servers 350 may be located off the network 10 but otherwise  
14 connected to or in communication with the client devices 20 and/or the first server 30.  
15 One or more alternate link directories 360 may reside on the one or more alternate servers  
16 350. The one or more alternate servers 350 may include other elements duplicating the  
17 functions of the server manager 380 and user data store 370, as well as additional link  
18 directories 310 and 320. The existence of the alternate servers 350 provides for flexibility  
19 in the distribution of link directory data across several servers, redundancy and  
20 interoperability across multiple networks and/or sets of client devices 20 and users of the  
21 Linkspace system 100.

22 Each of the several link directories 35, 310, 320 or 360 may be associated with  
23 and store link references 42, 52 and link relationships 45. These link references 42, 52  
24 and link relationships 45 may have attributes matching categories defined by an  
25 authorized user designated to manage such link directories 35, 310, 320 or 360. In this  
26 manner, each link directory 35, 310, 320 or 360 may be considered to be a community of  
27 interest. The authorized user designated to manage such link directories 35, 310, 320 or  
28 360 may also establish attributes by which to organize, sort and filter the link references  
29 and link relationships 45. Attributes may describe the types and properties of the  
30 document objects 40, 50 and the link relationships 45. Any authorized user of the link  
31 directories 35, 310, 320 or 360 may then create and place link references and link  
32 relationships 45 in the link directories 35, 310, 320 or 360 and assign attributes to the link  
33 references and link relationships 45.

1           Figure 3a further illustrates the provision for a further link relationship 345  
2   between the second document object 50 and a third document object 340. The link  
3   relationship 345 may be created by an authorized user of one of the client devices 20, just  
4   as the link relationship 45 between the first document object 40 and the second document  
5   object 50 was created. The link relationship 345 may be stored in a second link directory  
6   310, separated from the link relationship 45 stored in the first link directory 35. As such,  
7   the link relationships 45 and 345 may be considered to belong to differing communities of  
8   interest represented by the separate first link directory 35 and second link directory 310.  
9   A user of a client device 20 who is currently viewing or otherwise accessing the second  
10   document object 50 will only be presented with the link relationship 345 if the user is an  
11   authorized user of, and thus in the user directory 370 list for, the second link directory  
12   310. Furthermore, a user of a client device 20 who is currently viewing or otherwise  
13   accessing the second document object 50 will only be presented with both the link  
14   relationship 45 and the link relationship 345 if the user is an authorized user of, and thus  
15   in the user data store 370 lists for, both the first link directory 35 and the second link  
16   directory 310. A user of the Linkspace system may be or may apply to be an authorized  
17   user for any combination of or all of the link directories 35, 310, 320, and 360.

18           Figure 3b is a diagram showing more detail of one embodiment of the user data  
19   store 370 from Figure 3a. The user data store 370 may include a user directory 372, a  
20   user profile store 375, and a user account store 378.

21           The user directory 372 includes one or more user data records 374, typically one  
22   or more each for every authorized user of the servers 30, 350. The user data records 374  
23   may include personal identifying data for an associated authorized user and data  
24   indicating the link directories 35, 310, 320, 360 to which each user has access.

25           The user profile store 375 includes one or more user profile records 330, typically  
26   one or more each for every authorized user of the servers 30, 350. The user profile  
27   records 330 for each authorized user may further include one or more user profiles 332.

28           Each user profile 332 may contain data regarding specific, differing  
29   configurations of the user's personal, professional, geographic and other interests, and the  
30   servers 30, link directories 35, 310, 320, 360, and attributes associated with those  
31   interests, as entered by the user or collected by the client tool 220. The data in the user  
32   profile 332 may be used to determine what link directories 35, 310, 320, 360 that the user  
33   may have engaged. The data in the user profile 332 may further determine what attributes  
34   of link references 42, 52, and of link relationships 45, will be considered by the server 30

1 in returning the link references 42, 52 and the link relationships 45 from the link  
2 directories 35, 310, 320, 360 to the user's client device 20.

3 The user account store 378 includes one or more user account records 379, usually  
4 one each for every authorized user of the servers 30, 350. The user account records 379  
5 hold information regarding usage of the Linkspace system 100 by each authorized user.  
6 The information in the user account records 379 may include data on instances of the  
7 publication of link relationships 45, and the transmissions of link relationships 45 and  
8 link references 42, 52 based upon the document object displayed by the client tool 220 of  
9 each user. In alternate embodiments of the invention, data regarding the document  
10 objects 40, 50, 340 requested and accessed by users of the system 100 is not recorded in  
11 the user account records 379 against the individual authorized user in order to maintain  
12 user privacy with regard to what document objects 40, 50, 340 each individual user may  
13 request or access.

14 When an authorized user of a client device 20 creates a link relationship 45 that is  
15 stored in one or more of the link directories 35, 310, 320, 360, the server manager 380  
16 records in the user account record 379 (associated with the authorized user creating the  
17 link relationship 45) the activity of creating and storing a link relationship 45. Each of  
18 the authorized users of the link directories 35, 310, 320, 360 may be allowed to create  
19 link relationships 45 to be stored in one or more of the link directories 35, 310, 320 or  
20 360, to which that authorized user is permitted publication access. Each of the authorized  
21 users of each specific link directory 35, 310, 320, 360 may also be allowed access for  
22 display those link relationships 45 stored in the specific link directory 35, 310, 320, 360  
23 that relate to the first document object 40 or second document object 50 that the user is  
24 currently viewing on the user's client device 20.

25 The interaction of each of the elements of the server 30, alternate server 350, the  
26 client devices 20, and the first, second and third document objects 40, 50, and 340, along  
27 with the creation and presentation of the link relationships 45 and 345 may be illustrated  
28 by the application of the methods 600, 700, and 800 described below with reference to  
29 Figs. 6, 7, and 8.

30 Figure 4a shows the general structure of one embodiment of the link directory 35.  
31 This embodiment of the link directory 35 includes a link relationship table 420.

32 The link relationship table 420 comprises a list of link relationships 460, 470, 480,  
33 490. These link relationships 460, 470, 480, 490 correspond to the link relationships 45,  
34 345 created by users of the client device 20 as they are stored in the link directory 35.

1 The link relationship 460 comprises a field 462 containing a link reference 42 (L1)  
2 including the URL address of the first document object 40 related by the link relationship  
3 460; a field 463 containing a link reference 52 (L2) including the URL address of the  
4 second document object 50 related by the link relationship 460; a set of link relationship  
5 attributes 465; and a directional indicator 466 showing the nature of the link relationship  
6 between the two document objects, either unidirectional or bi-directional. The link  
7 relationship 460 is shown with the directional indicator 466 specifying that the link  
8 relationship 460 is a unidirectional link relationship.

9 Some or all of the list of link relationships 460, 470, 480, 490 comprising the link  
10 relationship table 420 may, in one embodiment of the invention, be stored on the server  
11 30 in the form of relational database records. The relational database record  
12 corresponding to the link relationship 460 may be comprised of one or more relational  
13 database fields corresponding to the field (L1) 462, field (L2) 463, link relationship  
14 attributes 465, and directional indicator 466. Each of the one or more relational database  
15 fields may be formatted and designated to store various forms of relational database data  
16 types. In one embodiment of the invention, the relational database field corresponding to  
17 the field 462, as well as the relational database field corresponding to the field 463, may  
18 contain data specifying the appropriate URL as text or other format appropriate for the  
19 network upon which the invention may be implemented. In one embodiment of the  
20 invention, the relational database field corresponding to the directional indicator 466 may  
21 be formatted as a simple flag (i.e., Boolean) data type such as True/False, Yes/No, or  
22 On/Off. Alternatively, the relational database field corresponding to the directional  
23 indicator 466 may be formatted as a type to allow entry of a value indicating whether the  
24 link relationship attribute 465 applies forward, backward or in both directions across the  
25 link relationship 460. In one embodiment of the invention, the link relationship attributes  
26 465 may be represented by one or more relational database fields. In this embodiment,  
27 the relational database fields comprising the link relationship attributes 465 may include a  
28 field of text data listing the assigned titles of the one or more specific link relationship  
29 attributes assigned to the link relationship 460. The relational database fields comprising  
30 the link relationship attributes 465 may then also include one or more attribute value  
31 fields containing data formatted appropriately for the corresponding link relationship  
32 attribute listed in the above described field of text data. For example, the plain language  
33 name link relationship attribute may have its corresponding value stored in a field  
34 formatted as text, whereas a zip code attribute may have its corresponding value stored in

1 a field formatted as a 5 or 9 digit integer, and a date attribute may have its corresponding  
2 value stored in a field formatted in a date format. In an alternative embodiment, the  
3 relational database fields comprising the link relationship attributes 465 may utilize  
4 relational database key fields which point to additional database tables containing the  
5 records specifying each available type of link relationship attribute for the link  
6 relationship 460 and key fields which point to additional tables containing the values  
7 associated with each of link relationship attribute identified by a key.

8 As with the link relationship 460, the link relationship 470 comprises a field 472  
9 containing a link reference 42 (L1) including the URL address of the first document  
10 object 40 related by the link relationship 470; a field 473 containing a third link reference  
11 (L3) including the URL address of the third document object 340 related by the link  
12 relationship 470; a set of link relationship attributes 475; and a directional indicator 476  
13 showing the nature of the link relationship between the two document objects, either  
14 unidirectional or bi-directional. The link relationship 470 is shown with the directional  
15 indicator 476 specifying that the link relationship 470 is a bi-directional link relationship.  
16 The link relationship 480 comprises a field 482 containing a link reference 52 (L2)  
17 including the URL address of the second document object 50 related by the link  
18 relationship 480; a field 483 containing the third link reference (L3) including the URL  
19 address of the third document object 340 related by the link relationship 480; a set of link  
20 relationship attributes 485; and a directional indicator 486 showing the nature of the link  
21 relationship between the two document objects, either unidirectional or bi-directional.  
22 The link relationship 480 is shown with the directional indicator 486 specifying that the  
23 link relationship 480 is a bi-directional link relationship.

24 The link relationship 490 comprises a field 492 containing a link reference 52  
25 (L2) including the URL address of the second document object 50 related by the link  
26 relationship 490; a field 493 containing a link reference 42 (L1) including the URL  
27 address of the first document object 40 related by the link relationship 490; a set of link  
28 relationship attributes 495; and a directional indicator 496 showing the nature of the link  
29 relationship between the two document objects, either unidirectional or bi-directional.  
30 The link relationship 490 is shown with the directional indicator 496 specifying that the  
31 link relationship 490 is a unidirectional link relationship.

32 The link relationship attributes 465, 475, 485, 495 may include a plain language  
33 name (not shown) associated with each of the link references 42, 52 participating in the  
34 respective link relationship 460, 470, 480, 490, as determined and entered by the user of



1 the client tool 220. The plain language name serves to describe the link reference 42, 52  
2 in terms better understood by the users of the system 100 than the URL associated with  
3 the link reference 42, 52. The link relationship attributes 465, 475, 485, 495 serve to  
4 describe the link references 42, 52 in terms useful to users of the system 100, and to place  
5 the link references 42, 52 in a context that may attract users to select the link references  
6 42, 52. Other examples of link relationship attributes 465, 475, 485, 495 may include  
7 descriptions of the content of either of the document objects 40, 50 related by the link  
8 relationship 460, 470, 480, 490, wherein that content may be described to include a  
9 product review, news article, product information page, competitor's product information,  
10 or product order forms, among other types of content.

11 The link relationship 470 may have a value assigned to the directional indicator  
12 476 specifying that the link relationship 470 is a bi-directional link relationship. This  
13 indicates that the link relationship attributes 475 apply to either of the two document  
14 objects (40 and 340) equally in the context of the link relationship 470.

15 The link relationship 460 may, on the other hand, have a value assigned to the  
16 direction indicator 466 specifying that the link relationship 460 is a unidirectional link  
17 relationship. This signifies that the link relationship attributes 465 apply in only one  
18 direction between the two document objects 40 and 50 represented in the fields 462 and  
19 463 through the link references 42 and 52 respectively. In this instance, a link  
20 relationship will not be transmitted and presented to the user of the client device 20 when  
21 requested in the direction opposite to that specified by the direction indicator 466. In the  
22 case of the link relationship 460 shown in Figure 4a, the attributes 465 apply only as the  
23 link relationship 460 is traversed from the first link reference 42 to the second link  
24 reference 52, and not in the reverse direction. In a similar manner, the link relationship  
25 490 may have a value assigned to the direction indicator 496 specifying that the link  
26 relationship 490 is a unidirectional link relationship. This signifies that the link  
27 relationship attributes 495 apply in only one direction between the two document objects  
28 50 and 40 represented in the fields 492 and 493 through the link references 52 and 42  
29 respectively. In the case of the link relationship 490 shown in Figure 4a, the attributes  
30 495 apply only as the link relationship 490 is traversed from the second link reference 52  
31 to the first link reference 42, and not in the reverse direction. In this instance, a link  
32 relationship will not be transmitted and presented to the user of the client device 20 when  
33 requested in the direction opposite to that specified by the direction indicator 496.

1 In an alternate embodiment, the direction indicator 466 of the link relationship  
2 460 may comprise a plurality of directional indicator fields (not shown). Each directional  
3 indicator field may then correspond to one of the one or more link relationship attributes  
4 465 and indicate whether the corresponding link relationship attribute 465 may apply in  
5 one direction or in both directions between the two document objects 40 and 50  
6 represented in the fields 462 and 463 through the link references 42 and 52 respectively.  
7 Likewise, the direction indicator 496 of the link relationship 490 may comprise a plurality  
8 of directional indicator fields (not shown). Each directional indicator field may then  
9 correspond to one of the one or more link relationship attributes 495 and indicate whether  
10 the corresponding link relationship attribute 495 may apply in one direction or in both  
11 directions between the two document objects 50 and 40 represented in the fields 492 and  
12 493 through the link references 52 and 42 respectively. In the alternate embodiment, a  
13 similar arrangement may then be implemented for the remaining direction indicators 476,  
14 486 of the link relationships 470, 480.

15 Figure 4b shows the general structure of another embodiment of the link directory  
16 35. This embodiment of the link directory 35 includes a document object table 410, and a  
17 link relationship table 420, as described above for Figure 4a.

18 The document object table 410 comprises a set of link references 430, 440, 450 to  
19 document objects located on the network 10 to which the link directory 35 is connected.  
20 Each link reference 430, 440, 450 further comprises the URL 432, 442, or 452 of the  
21 respective document object 40, 50, 340 of interest; a set of document object attributes  
22 435, 445, 455 associated with the URL 432, 442, 452; and a list 437, 447, 457 of pointers  
23 to any of the link relationships 460, 470, 480, 490 by which the link references 430, 440,  
24 450 may be connected to each other with context. In the case of a link relationship 460,  
25 490 having the direction indicator 466, 496 set to indicate that the link relationship 460,  
26 490 is unidirectional, the link relationship 460, 490 will be listed only in the list 437, 447,  
27 457 of pointers for the link reference 430, 440, 450 that begins the unidirectional link  
28 relationship 460, 490. The link references 430, 440, and 450 in Figure 4b correspond to  
29 the link references 42, 52, and the third link reference (not shown), as described in  
30 Figures 1-4a above, and which point to the URL addresses of the document objects 40,  
31 50, and 340 respectively.

32 The document object attributes 435, 445, 455 serve to describe the link references  
33 430, 440, 450 in terms useful to users of the system 100, and to place the link references  
34 430, 440, 450 in a context that may attract users to select the link references 430, 440,

1 450. The document object attributes 435, 445, 455 may include a plain language name  
2 that serves to describe the document object 40, 50, 340 in terms better understood by the  
3 users of the system 100 than the URLs associated with the link references 430, 440, 450;  
4 descriptions of the content of the document object 40, 50, 340 associated with link  
5 references 430, 440, 450, wherein that content may be described to include a product  
6 review, news article, product information page, competitor's product information, or  
7 product order forms, among other types of content; and other descriptive characteristics  
8 associated with the document object 40, 50, 340.

9 The link references 430, 440, and 450 may be created and placed in the document  
10 object table 410 when a user of the client device 20 creates a link relationship 45 between  
11 a first document object 40 and a second document object 50 or a third document object  
12 340.

13 The link relationship table 420 shown in Figure 4b comprises the same list of link  
14 relationships 460, 470, 480, 490, detailed above in Figure 4a. In Figure 4b, the link  
15 relationship 460 comprises a field 462 containing a pointer to the link reference 430 for  
16 the first document object 40 related by the link relationship 460; a field 463 containing a  
17 pointer to the link reference 440 for the second document object 50 related by the link  
18 relationship 460; the link relationship attributes 465; and the directional indicator 466. In  
19 Figure 4b, the link relationship 470 comprises a field 472 containing a pointer to the link  
20 reference 430 for the first document object 40 related by the link relationship 470; a field  
21 473 containing a pointer to the link reference 450 for the third document object 340  
22 related by the link relationship 470; the link relationship attributes 475; and the  
23 directional indicator 476. In Figure 4b, link relationship 480 comprises a field 482  
24 containing a pointer to the link reference 440 for the second document object 50 related  
25 by the link relationship 480; a field 483 containing a pointer to the link reference 450 for  
26 the third document object 340 related by the link relationship 480; the link relationship  
27 attributes 485; and the directional indicator 486. Likewise, in Figure 4b, the link  
28 relationship 490 comprises a field 492 containing a pointer to the link reference 440 for  
29 the second document object 50 related by the link relationship 490; a field 493 containing  
30 a pointer to the link reference 430 for the first document object 40 related by the link  
31 relationship 490; the link relationship attributes 495; and the directional indicator 496.

32 Figure 5 illustrates one embodiment of the present invention in which the  
33 invention may operate on multiple networks of varying degrees of network security. The  
34 different networks on which the systems and methods of the present invention may be

implemented include a public network such as the Internet 510, a private network 520 that may be connected to the Internet 510, and a closed network 530 that is secure and not accessible to users not connected to the closed network 530. The closed network 530 is not connected to any public network such as the Internet 510, and is not connected to another private network 520.

The public network or Internet 510 may have components connected to it that implement the present invention, including one or more Linkspace-enabled client users 511, one or more link directories 512, one or more Linkspace-hosted content units 513, and one or more networked content units 514. The link directories 512 described here are functionally equivalent to the link directories 35, 310, 320, and 360 described above in connection with Figures 1, 2 and 3a. The Linkspace-hosted content units 513 comprise information storage devices connected to the network 510 that provide additional document object storage facilities to users of the Linkspace system 100 separate from the publicly or privately operated networked content units 514. The networked content units 514 may include networked data servers or web servers.

The Linkspace-hosted content units 513 are provided to accommodate the streamlined publication and/or distribution of content by users of the Linkspace system 100. The client tool 220 may allow a user of the Linkspace system 100 to store document objects of his or her own creation through a simplified procedure, i.e., a publish document function enabled through the client GUI display 225. The user of the client device 20 may select a document object 40 that she wishes to publish through the Linkspace-hosted content units 513, or she may create a document object (not shown) using the rendering tool 210 or other document object creation tool. The user of the client device 20 then selects the publish document function through the client GUI display 225 and selects the link directories 35, 310, 320, 360 in which she wishes to create and publish new link relationships 45, 345 referencing the user created or selected document object. The user of the client device 20 may then create and publish link relationships 45, 345 referencing the user created or selected document object. The client tool 220 may automatically upload the user created or selected document object from the user's client device 20, or from another location on the network, in this case the Internet 510, and save it on the Linkspace-hosted content unit 513. The client tool 220 may then publish the new link relationships 45, 345 referencing the user created or selected document object to the appropriate link directory 35, 310, 320, 360, and then make the user created or selected document object available to other users of the Linkspace system 100 through the new

1 link relationships 45, 345. The activity of publishing a user created or selected document  
2 object in this manner is also recorded in the appropriate user account record 379 for the  
3 user creating or selecting the document object to be published.

4 Similarly, the private network 520 may have connected to it components that  
5 implement the present invention, including one or more Linkspace-enabled client users  
6 521, one or more link directories 522, one or more Linkspace-hosted content units 523,  
7 and one or more networked content units 524.

8 Additionally, the closed network 530 may have connected to it components that  
9 implement the present invention, including one or more Linkspace-enabled client users  
10 531, one or more link directories 532, one or more Linkspace-hosted content units 533,  
11 and one or more networked content units 534.

12 In Figure 5, the private network 520 is shown connected to the public network or  
13 Internet 510. This may allow Linkspace-enabled client users 521 connected to the private  
14 network 520 to also be permitted access to any of the one or more link directories 512,  
15 Linkspace-hosted content units 513, and networked content units 514 that are connected  
16 to the public network or Internet 510. However, Linkspace-enabled client users 511  
17 connected to the public network or Internet 510 that are not also among the group of  
18 authorized Linkspace-enabled client users 521 of the private network 520, may not be  
19 permitted to access the one or more link directories 522, Linkspace-hosted content units  
20 523, and networked content units 524 that are connected to the private network 520.

21 A Linkspace client user 531 connected to the closed network 530, and therefore  
22 not connected to either the public network or Internet 510 nor to the private network 520,  
23 may only be permitted access to the one or more link directories 532, Linkspace-hosted  
24 content units 533, and networked content units 534 that are connected to the closed  
25 network 530.

26 Figure 6 is a flowchart showing the steps of a method 600 according to one  
27 embodiment of the present invention. The method 600 includes the steps of a first user  
28 (not shown) of a client device 20 locating a first document object 40 (step 610); the first  
29 user locating a second document object 50 (step 620); and the first user creating a link  
30 relationship 45 between the first document object 40 and the second document object 50  
31 (step 630). The method 600 includes the additional steps of storing the link relationship  
32 45 created by the first user in a link directory 35 (step 640); and providing access to the  
33 link directory 35 to a second user (not shown) of another client device 20 (step 650).

1 The method 600 may include a step for providing authorized users of client  
2 devices 20 access to the link relationships 45 stored in link directories 35, based upon the  
3 document object 40 currently accessed by the users on the users' client device 20 (step  
4 660).

5 Figure 7 is a flowchart showing the steps of a method 700 for accessing and  
6 displaying link relationships and related document objects on a network according to one  
7 embodiment of the present invention. The method 700 initiates when a user of a client  
8 device 20 engages the rendering tool 210 to request, access and display a document object  
9 40 (step 710). The user of the client device 20 then engages the client tool 220 and is  
10 authenticated by a server 30 (step 715). The user of the client device 20 then selects a  
11 user profile 332 (step 717) that has been returned to the client device 20 upon  
12 authentication of the user by the server 30 in step 715. The selected user profile 332 may  
13 be used to determine what attributes of the link relationships 45 will be applied to filter  
14 and sort the link references 430, 440, 450 and link relationships 460, 470, 480 returned by  
15 the server 30. By filtering and sorting using attributes, a manageable and meaningful  
16 group of relevant link references 430, 440, 450 may be displayed to the user based on the  
17 user's needs and interests.

18 In alternate embodiments of the method 700, the steps 715 and 717 may occur  
19 before the step 710.

20 With the user profile 332 selected and the document object 40 displayed, the user  
21 then selects a client tool 220 function (step 720). The first function that the user may  
22 select is to enter a document object URL 215 into the rendering tool 210, whereupon that  
23 document object URL 215 is captured by the client tool 220 and transmitted to the servers  
24 30 (step 730). The activity of transmitting the document object URL 215 to the servers  
25 30 by the client tool 220 may be recorded and stored in an appropriate location within the  
26 user data store 370.

27 The server 30 then processes the transmitted document object URL 215 across the  
28 various link directories 35 to which the user is authorized access. One method of  
29 processing by the server 30 is according to the following steps. The server 30 performs a  
30 search of the document object tables 410 of all link directories 35 to find all instances of  
31 the document object URL 215 (step 735). The server 30 then searches the Link  
32 relationship tables 420 in the link directories 35 where the URL 215 was found. This  
33 search by the server 30 locates all link relationships 460, 470, 480, 490 referencing the  
34 URL 215 as one of the pointers to link references 462 or 463, 472 or 473, 482 or 483, 492

or 493 included in those link relationship 460, 470, 480, 490 (step 740). The server 30 then accumulates all the URLs 432, 442, 452 related, through the link relationships 460, 470, 480, 490 identified in step 740, to the URL 215. The server 30 also accumulates the document object attributes 435, 445, 455 associated with the identified URLs 432, 442, 452 and the link relationship attributes 465, 475, 485, 495 associated with the link relationships 460, 470, 480, 490 identified in step 740 (step 745).

The accumulated URLs 432, 442, 452 are then filtered by link relationship attributes 465, 475, 485, 495 (step 750), and then filtered again by document object attributes 435, 445, 455 (step 755). In alternate embodiments of the method 700, the accumulated URLs 432, 442, 452 may be filtered first by document object attributes 435, 445, 455 (step 755) and then by link relationship attributes 465, 475, 485, 495 (step 750). The user profile 332 is applied to determine what link relationship attributes 465, 475, 485, 495, and document object attributes 435, 445, 455 to use in filtering the accumulated URLs 432, 442, 452. The filtered URLs 432, 442, 452 are then sent back to the client device 20 that transmitted the URL 215, along with the associated document object attributes 435, 445, 455, and associated link relationship attributes 465, 475, 485, 495 (step 760). The activity of transmitting the filtered URLs 432, 442, 452, along with the associated document object attributes 435, 445, 455, and associated link relationship attributes 465, 475, 485, 495, to the client device 20 may be recorded and stored in an appropriate location within the user data store 370. Alternatively, the first filtering steps 750, 755 may be performed by the client device 20.

The client tool 220, upon receiving the filtered URLs 432, 442, 452 from the server 30, may further filter and sort the returned URLs 432, 442, 452 according to data stored in the selected user profile 332 (step 765). In this manner, the data in the user profile 332 may be applied to the filtered and sorted URLs 432, 442, 452 on either the server 30 or the client tool 20.

The filtered and sorted URLs 432, 442, 452 are then displayed to the user of the client device 20 by the client GUI display 225 and the client tool 220 alerts the user of the client device 20 to the availability of related links (in the form of the returned URLs 432, 442, 452) by means of an indicator in the client GUI display 225 (step 770). The method 700 then returns to step 720 to await further action by the user of the client device 20.

If, at step 720, the user of the client device 20 selects one of the URL links 432, 442, 452 displayed by the Linkspace GUI display as being related by link relationships 460, 470, 480, 490 to the presently accessed document object 40 with the URL 215 (step

1 780), the rendering tool 210 then accesses the new document object 50 associated with  
2 the selected URL and displays that document object 50 in the GUI display 218 of the  
3 rendering tool 210 (step 785). The new document object URL address 215 of the selected  
4 document object 50 is then passed on to the servers 30 (step 790) and the method 700  
5 continues with step 735, as above, using the URL 215 of the new document object 50 as  
6 the URL to search for.

7 Figure 8 is a flowchart showing the steps of a method 800 for creating and  
8 publishing link relationships according to one embodiment of the present invention. The  
9 method 800 initiates when a user of the client device 20 engages the client tool 220 and is  
10 authenticated by a server 30 (step 810). The user of the client device 20 may then select a  
11 publish link relationship function of the client tool 220 (step 815).

12 The user of the client device 20 may then navigate, using the rendering tool 210,  
13 to the first document object 40 of the new link relationship 45 that the user of the client  
14 device 20 wishes to create and publish. The user may then select a declare first link  
15 function of the client tool 220 (step 820). The user of the client device 20 may then  
16 navigate, again using the rendering tool 210, to the second document object 50 that the  
17 user of the client device 20 wishes to associate by means of a link relationship 45 with the  
18 first document object 40. The user can then select the declare second link function of the  
19 client tool 220 (step 825). The user of the client device 20 has now selected both ends of  
20 a link relationship 45.

21 The user now may select which of the link directories 35 in which the user wishes  
22 to publish the new link relationship 45 (step 830). The user of the client device 20 may  
23 then further assign link relationship attributes, such as those shown in figure 4 (465, 475,  
24 485, 495) to the link relationship 45, along with assigning any document object attributes,  
25 such as those shown in figure 4 (435, 445, 455), to the first document object 40 and  
26 second document object 50 of the link relationship 45 (step 835). The user may then  
27 interact with a Linkspace GUI 225 button or element to complete the link relationship  
28 publish function (step 840). Upon completion of the link relationship publish function on  
29 the client device, the URLs and document object attributes of the document objects 40  
30 and 50 associated by the new link relationship 45 are stored in the document object table  
31 410 in the selected link directory 35 (step 850). Additionally, the new link relationship  
32 45, along with the URL references to the first document object 40 and second document  
33 object 50 and the link relationship attributes, such as those shown in figure 4 (465, 475,  
34 485, 495), are stored in the link relationship table 420 in the selected link directory 35



1 (step 855). The method 800 for creating and publishing link relationships completes by  
2 recording the publishing activity to the user account record 379 associated with the user  
3 of the client device 20 for later tracking and billing purposes (step 880).

4 Figure 9 is an example of a user interface, more specifically, a screen view of a  
5 user interface for a relate links dialog box 900, one element of the user interface of one  
6 embodiment of the invention. The relate links dialog box 900 is invoked when a user of  
7 the client tool 220 engages the publish link relationship function of the client tool 220. In  
8 the embodiment shown in Figure 9, the relate links dialog box 900 includes a drop down  
9 list 910 for selecting a community of interest, a user interface term referring to one of the  
10 one or more link directories 35, and a checkbox 915 for indicating whether the link  
11 relationship 45 being created is to operate bi-directionally or unidirectionally. If the  
12 checkbox 915 is checked, then the link relationship 45 being created will only apply in  
13 one direction. In the example illustrated in Figure 9, the user has selected the community  
14 of interest (link directory 35) referred to as "Wireless Washington," a link directory 35  
15 storing link references 42, 52 and link relationships 45 considered by their creators as  
16 relevant to wireless device users in the Washington, DC metropolitan area.

17 The relate links dialog box 900 further includes a link-from section 920, a link-to  
18 section 930, a link relationship attributes display box 970, a submit link relationship  
19 button 980 and a cancel button 985. The submit link relationship button 980 is selected  
20 by the user when the user has selected and/or entered all information associated with the  
21 link references 42, 52 and the link relationship 45 that the user wishes to publish. Upon  
22 selection of the submit link relationship button 980, the client tool 220 closes the relate  
23 links dialog box 900 and transmits the information associated with the created link  
24 relationship 45 to one of the one or more servers 30. The cancel button 985 may be  
25 selected by the user to abort the creation and publication of the link relationship 45 that  
26 the user initiated and to close the relate links dialog box 900.

27 In an alternate embodiment, the relate links dialog box may include a target  
28 publish button (not shown) which permits the user publishing the link relationship 45 to  
29 target specific users of the system 100 to which the user publishing the link relationship  
30 45 wishes to have the link relationship 45 made available to.

31 In the embodiment shown in Figure 9, the link-from section 920 may include a  
32 first document object URL 922 associated with the first document object 40 included in  
33 the link relationship 45 being created, where the first document object URL 922 was  
34 captured when the publish link relationship function was engaged; a first plain language

1 name field 925; and a listing of first link reference attributes 940 and the attribute values  
2 942 associated with those first link reference attributes 940. In the example illustrated by  
3 Figure 9, the first document object URL 922 is the address of a first document object 40  
4 that is a web page for a coffee and dessert shop. The first plain language name field 925  
5 may be captured when the publish link relationship function was engaged and/or may be  
6 edited by the user creating the link relationship 45. An exemplary first link reference  
7 attribute for food 945, and the value of specialty foods 947 assigned to the first link  
8 reference attribute 945 by the user creating the link relationship 45, are also shown.

9 The link-to section 930 similarly may include a second document object URL 932  
10 associated with the second document object 50 included in the link relationship 45 being  
11 created, where the second document object URL 932 was captured when the publish link  
12 relationship function was engaged; a second plain language name field 935; and a listing  
13 of second link reference attributes 950 and the attribute values 952 associated with those  
14 second link reference attributes 950. In the example illustrated by Figure 9, the second  
15 document object URL 932 is the address of a second document object 40 that is a web  
16 page for a "LinkSpace Restaurant" located in McLean, Virginia (a suburb of  
17 Washington). The second plain language name field 935 may be captured when the  
18 publish link relationship function was engaged and/or may be edited by the user creating  
19 the link relationship 45. An exemplary second link reference attribute for location 955,  
20 and the value of address 995 assigned to the second link reference attribute 955 by the  
21 user creating the link relationship 45, are also shown. In addition, in the example  
22 illustrated by Figure 9, a subordinate attribute for city 957, subordinate under the attribute  
23 for location 955, and a value of address 995 along with the assigned value of McLean 958  
24 for the subordinate attribute for city 957, are also shown in the link-to section 930.  
25 Further subordinate attributes may include a street 956 with a value 959 of 12345 Main  
26 Street.

27 The link relationship attributes display box 970, as shown for the embodiment  
28 illustrated by Figure 9, includes a list of link relationship attributes 972 and a delete link  
29 relationship attribute button 975. The link relationships 972 are formed by pairs of first  
30 link reference attributes 940 and second link reference attributes 950 that the user creating  
31 the link relationship 45 has selected to describe the nature of the link relationship 45.  
32 These link relationship attributes 972 may form the link relationship attributes 465, 475,  
33 485, 495 described in Figure 4a. The delete link relationship attribute button 975 may be

1 used to delete a selected link relationship attribute 972 displayed in the link relationship  
2 attributes display box 970.

3 The exemplary link relationship attribute 972 shown in Figure 9 indicates that the  
4 user creating the link relationship 45 has declared that the city subordinate attribute 957  
5 (one selected second link reference attribute 950) of the Linkspace Restaurant associated  
6 with the second document object 50, having a value of McLean 958, is related to the food  
7 attribute 945 (one selected first link reference attribute 940), having a value of specialty  
8 foods 947, of the coffee shop associated with the first document object 40. As a result,  
9 once the exemplary link relationship 45 shown in Figure 9 is created and published, other  
10 users of Linkspace-enabled client devices 20 that request and/or access the Linkspace  
11 Restaurant web page may be presented with a link reference 42, 52 pointing to the web  
12 page for the coffee and dessert shop, as illustrated in the link reference display window  
13 1020 shown in Figure 10.

14 In one embodiment of the invention, the link relationship attribute 972 may be  
15 declared by the user performing a drag-and-drop operation wherein the link reference  
16 attribute 957 is dragged and dropped onto the link reference attribute 945, creating the  
17 link relationship attribute 972 which relates the two document objects 40, 50 by the  
18 association of the city subordinate attribute 957 to the food attribute 945. In an alternate  
19 embodiment, the creation and selection of link relationship attributes 972 may be  
20 performed in a manner similar to that used in the link-to section 930 and link-from  
21 section 920 described above, utilizing a set of link relationship attribute types along with  
22 data input fields for entering or otherwise selecting values for those attributes.

23 Figure 10 is an example of a screen view for one embodiment of the client GUI  
24 display 225 for one embodiment of the invention, wherein the client GUI display 225 is  
25 integrated into the GUI display 218 of the rendering tool 210. In the embodiment shown  
26 in figure 10, a client toolbar 1010 and a link reference display window 1020 together  
27 comprise the client GUI display 225. A browser window 1030 displays the document  
28 object (40, 50) being requested and accessed by the rendering tool 210 and having the  
29 document object URL address 215 displayed in an address bar field 1040.

30 The client toolbar 1010 includes a number of GUI buttons that initiate various  
31 functions of the client tool 220. A client logon button 1050 initiates a connection  
32 between the client tool 220 and one or more servers 30. A client logoff button 1055 ends  
33 a user session for the client tool 220 and disconnects the client tool 220 from the one or  
34 more servers 30. A mark starting page button 1060 may be engaged to initiate the publish

1 link relationship function of the client tool 220 by setting the currently displayed  
2 document object 40 shown in the browser window 1030 and referenced by the document  
3 object URL address 215 displayed in the address bar field 1040 as the first document  
4 object 40 in the link relationship 45. After the user navigates to a second document  
5 object 50, a mark ending page button 1065 may be engaged to complete the selection of  
6 participating document objects 40, 50 for the publish link relationship function of the  
7 client tool 220. Engaging the mark ending page button 1065 sets the newly displayed  
8 document object 50 shown in the browser window 1030 and referenced by the document  
9 object URL address 215 displayed in the address bar field 1040 as the second document  
10 object 50 in the link relationship 45, and opens a relate links dialogue box 900 (shown  
11 and described in Figure 9 above) to allow the user of the client tool 220 to assign  
12 attributes to the link relationship 45.

13 The client toolbar 1010 also may include three icons that indicate the availability  
14 and type of link references 42, 52 related to the document object 40 open in the browser  
15 window 1030. These icons may include a publisher links indicator 1071, a private links  
16 indicator 1072, and a community links indicator 1073. These icons permit separation of  
17 link references 42, 52 into categories. These categories allow for broad classification of  
18 link references 42, 52 and enable the user of the client tool 220 to quickly identify who is  
19 offering the link relationships 45, the user of the client too 220 himself, a representative  
20 of the publisher of the document object 40, 50 they are viewing, or a third party.

21 The link reference display window 1020 presents the user with a hierarchical  
22 listing of any link references 42, 52, delivered by the server 30, that may be related to the  
23 document object 40 that is currently displayed in the browser window 1030 and has the  
24 document object URL address 215 shown in the address bar field 1040. The link  
25 reference display window 1020 may be presented in a tabbed format, wherein each tab  
26 may contain a different set of link references 42, 52 depending on the type of link  
27 reference and link relationship involved. In one embodiment of the invention, there may  
28 be three different tabs at the top of the link reference display window 1020, each  
29 corresponding to one of the indicator icons (1071, 1072, 1073) in the client toolbar 1010.  
30 The first tab may be a private links tab 1074, corresponding to the private links indicator  
31 1072. The second tab may be a publisher links tab 1075, corresponding to the publisher  
32 links indicator 1071. The third tab may be a community links tab 1076, corresponding to  
33 the community links indicator 1073.

1 The publisher links tab 1075 displays an embodiment of the link reference display  
2 window 1020 presenting link references 42, 52 created by an entity responsible for the  
3 document object 40 displayed in the browser window 1030. The private links tab 1074  
4 displays an embodiment of the link reference display window 1020 presenting link  
5 references 42, 52 created by the user of the client tool 220. The community links tab  
6 1076 displays an embodiment of the link reference display window 1020 presenting link  
7 references 42, 52 created by the other users of the system 100.

8 The document object 40 displayed in the browser window 1030 in Figure 10 is a  
9 representative web page, in this case for a restaurant named Linkspace. When this page is  
10 displayed, and the client tool 220 is engaged, as indicated by the recessed display of the  
11 client logon button 1050 in the client toolbar 1010, one or more of the indicator icons  
12 (1071, 1072, 1073) in the client toolbar 1010 will become highlighted if there are any link  
13 references 42, 52 available of the corresponding type.

14 For example, as illustrated in Figure 10, the community links indicator 1073 is  
15 highlighted, while the publisher links indicator 1071 and the private links indicator 1072  
16 are grayed out. This indicates that the server 30 has returned one or more link references  
17 42, 52 that are categorized as community links and has not returned any link references  
18 42, 52 categorized as publisher or private links. The returned link references 42, 52 are  
19 displayed in the link reference display window 1020 under the community links tab 1076.  
20 In this case, the link references 42, 52 are displayed in a hierarchical listing under affinity  
21 directory headings 1081, 1082. The affinity directory heading 1082 shown represents one  
22 community of interest, corresponding to one link directory 35 on a server 30, maintaining  
23 one set of link relationships 45 and link references 42, 52, that may include the document  
24 object 40 displayed in the browser window 1030. In addition, under each affinity  
25 directory heading 1081, 1082, there may be displayed one or more attribute folders 1091,  
26 1092. Each attribute folder 1091, 1092 may contain a grouping of listed hyperlinks 1095,  
27 1096 drawn from the respective affinity directory heading 1082 and related to the  
28 document object 40 displayed in the browser window 1030 by a particular link  
29 relationship attribute 972.

30 In the example shown in Figure 10, affinity directory heading 1082 indicates a  
31 link directory 35 focusing on wireless devices in the Washington, DC area. Also shown  
32 in the example in Figure 10, the attribute folder 1091 groups listed hyperlinks 1095 by the  
33 link relationship attribute 972, further relating document objects 40 to specialty food  
34 document objects 50. The listed hyperlink 1095, listed under the attribute folder 1091,

1 comprises the text of the plain language name attribute of a document object concerning  
2 coffee and dessert after dinner. In this manner, the listed hyperlink 1095, displayed under  
3 the affinity directory heading 1082 and the attribute folder 1091, represents a link  
4 reference 52 to a document object 50 that is related, as a document object of interest to  
5 wireless device users in the Washington area, and as a specialty food document object, to  
6 the document object 40, the restaurant web page, displayed in the browser window 1030.

7 The attribute folder 1092 shown in the example in Figure 10 groups listed  
8 hyperlinks 1096 by the link relationship attribute 972 further relating documents objects  
9 40 to document objects 50 concerning the downtown area of the Washington, DC suburb  
10 of McLean. The listed hyperlink 1096 is to a LinkNexus document object for the city of  
11 McLean. A LinkNexus document object may comprise a listing of further link references  
12 42, 52 to document objects 40, 50 relating to a particular subject. In the case illustrated in  
13 Figure 10, the LinkNexus document object indicated by the listed hyperlink 1096 may  
14 contain link references 42, 52 concerning the suburban city of McLean. In this manner,  
15 the listed hyperlink 1096, displayed under the affinity directory heading 1082 and the  
16 attribute folder 1092, represents a link reference 52 to a document object 50 that is  
17 related, as a document object of interest to wireless device users in the Washington area,  
18 and as a link to content relevant to downtown McLean, to the document object 40, the  
19 restaurant web page, displayed in the browser window 1030.

20 The affinity directory heading 1081 shown in the example in Figure 10 indicates a  
21 community related to "Your Company," the user's company. This affinity directory  
22 heading 1081 may contain link references 42, 52 to document objects 40, 50 maintained  
23 on the user's company's private network 520, accessible to users within the company, but  
24 not to the general public, as shown and described in Figure 5.

25 The example of a screen view for one embodiment of the client GUI display 225  
26 in Figure 10 may further include a publish document object button 1045 and a submit link  
27 relationship annotation button 1047. The publish document object button 1045 activates  
28 a publish document object function of the client tool 220 and opens a publish document  
29 object dialog box 1100 within the client user interface 225. The submit link relationship  
30 annotation button 1047 activates a submit link relationship annotation function of the  
31 client tool 220 and opens a submit link relationship annotation dialog box 1200 within the  
32 client user interface 225.

33 Figure 11 is an example of a user interface, more specifically, a screen view of a  
34 user interface for a publish document object dialog box 1100 according to one

embodiment of the invention. Using the methods, users may publish link relationships 45 as well as publish or make accessible document objects 40, 50. The publish document object dialog box 1100 permits a user to complete the publish document object function of the client tool 220, enabling the user of the invention to distribute a first document object 40 to other users of the network 10, where the first document object 40 that may not have been otherwise available to other users of the network 10, or not previously stored on the network 10, and to create a link relationship 45 between the first document object 40 and a second document object 50 stored on the network. In one embodiment of the invention, the first document object 40 may be stored on the client device 20.

In the embodiment shown in Figure 11, the publish document object dialog box 1100 includes many similar features to those of the relate links dialog box 900 described in Figure 9. In the publish document object dialog box 1100 of Figure 11, the link-to section 930 of the relate links dialog box 900 in Figure 9 is replaced with a content section 1140 that describes the first document object 40 that the user wishes to publish to the other users of the invention on the network 10. The publish document object dialog box 1100 includes a drop down list 1110 for selecting a community of interest, implemented as one or more link directories 35, to which the user wishes to publish the first document object 40, and a checkbox 1120 for indicating whether the link relationship 45 being created is to operate bi-directionally or unidirectionally. If the checkbox 1120 is checked, then the link relationship 45 being created will only apply in one direction. In the example illustrated in Figure 11, the user has selected the community of interest with the name "Wireless Washington" which represents a link directory 35 storing link references 42, 52 and link relationships 45 considered by their creators as relevant to wireless device users in the Washington, DC metropolitan area.

The publish document object dialog box 1100 may further include a link section 1130 containing information regarding the second document object 50 to which a link relationship 45 to the first document object 40 is to be created, and a content section 1140 containing information regarding the first document object 40 that the user wishes to publish to other users of the invention. The publish document object dialog box 1100 also includes a link relationship attributes display box 1170, a submit to publish document object button 1180, a target publish button 1182, and a cancel publication button 1185. The submit to publish document object button 1180 is selected by the user when the user has selected and/or entered all information associated with the link reference 52 to the second document object 50, the link reference 42 to the first document object 40 the user





1 other document objects 50 through other link directories 35 using the relate links dialog  
2 box 900 illustrated in Figure 9.

3 The cancel button 1185 may be selected by the user to abort the creation and  
4 publication of the first document object 40 and the associated link relationship 45 and to  
5 close the publish document object dialog box 1100.

6 The target publish button 1182 permits the user publishing the first document  
7 object 40 to target specific users of the system 100 to which the user publishing the first  
8 document object 40 wishes to have the first document object 40 made available to.  
9 Activation of the target publish button 1182 by the user publishing the first document  
10 object 40 opens a target published document objects dialog box 1400 shown in Figure 14.

11 The link section 1130 may include a second document object URL 1132  
12 associated with the second document object 50 included in the link relationship 45 being  
13 created, where the second document object URL 1132 was captured when the publish  
14 document object function was engaged; a plain language name field 1135; and a listing of  
15 second link reference attributes 1150 and the attribute values 1155 associated with those  
16 second link reference attributes 1150. In the example illustrated by Figure 11, the second  
17 document object URL 1132 is the address of a second document object 50 that is a web  
18 page for the "LinkSpace Restaurant" located in McLean, Virginia. The plain language  
19 name field 1135 may be captured when the publish document object function was  
20 engaged and/or may be edited by the user creating the link relationship 45.

21 In the embodiment shown in Figure 11, the content section 1140 includes a first  
22 plain language title field 1142; a first document object file path 1145 associated with the  
23 first document object 40 the user wishes to publish to other users of the invention; a find  
24 file button 1147; and a listing of first link reference attributes 1160 and the attribute  
25 values 1165 associated with those first link reference attributes 1160. In the example  
26 illustrated by Figure 11, the first document object file path 1145 is the file location  
27 address of a first document object 40 stored on the client device 20 where the first  
28 document object 40 is a dinner menu for the "Linkspace Restaurant" currently residing on  
29 the user's client device 20 where it may not be accessible to other users of the network  
30 10. Selection of the find file button 1147 allows the user to locate the file on the client  
31 device 20 or other location accessible to the client device 20 and define the first document  
32 object file path 1145.

33 The link relationship attributes display box 1170, as shown for the embodiment  
34 illustrated by Figure 11, includes a list of link relationship attributes 1172 accompanied

1 by a delete link relationship attribute button 1175. The link relationship attributes 1172  
2 are formed by pairs of first link reference attributes 1150 and second link reference  
3 attributes 1160 that the user publishing the first document object 40 and creating the link  
4 relationship 45 has selected to describe the nature of the link relationship 45 between the  
5 first document object 40 and the second document object 50. The delete link relationship  
6 attribute button 1175 may be used to delete a selected link relationship attribute 1172  
7 displayed in the link relationship attributes display box 1170.

8 Figure 12 is an example of a user interface, more specifically, a screen view of a  
9 user interface for a submit link relationship annotations dialog box 1200 according to one  
10 embodiment of the invention. In a manner similar to the publish document object dialog  
11 box 1100, the submit link relationship annotations dialog box 1200 permits a user to  
12 complete a submit link relationship annotation function of the client tool 220, enabling  
13 the user of the invention to create and publish to other users of the network 10 text  
14 comments regarding a first document object 40 located on the network 10, and to create a  
15 link relationship 45 between the first document object 40 and the user-created text  
16 comments regarding the first document object 40.

17 In the embodiment shown in Figure 12, the submit link relationship annotations  
18 dialog box 1200 includes many similar features to those of the publish document object  
19 dialog box 1100 described in Figure 11. In the submit link relationship annotations  
20 dialog box 1200 of Figure 12, the content section 1140 of the publish document object  
21 dialog box 1100 in Figure 11 is replaced with a comments section 1240 that includes the  
22 text comments regarding the first document object 40 that the user wishes to make  
23 available to the other users of the invention on the network 10. The submit link  
24 relationship annotations dialog box 1200 includes a drop down list 1210 for selecting a  
25 community of interest, implemented as one or more link directories 35, to which the user  
26 wishes to publish the link relationship 45 and the text comments regarding the first  
27 document object 40, and a checkbox 1220 for indicating whether the link relationship 45  
28 being created is to operate bi-directionally or unidirectionally. If the checkbox 1220 is  
29 checked, then the link relationship 45 being created will only apply in one direction.

30 The submit link relationship annotations dialog box 1200 may further include a  
31 link section 1230 containing information regarding the first document object 40 for which  
32 the text comments are to be created; a comments section 1240 containing information  
33 describing the comments regarding the first document object 40 that the user wishes to  
34 make available to other users of the invention; and a comment entry box 1270 where the

1 user enters the text of her comments regarding the first document object 40. The submit  
2 link relationship annotations dialog box 1200 also includes a link relationship attributes  
3 display box 1280, a submit comments button 1290 and a cancel submission button 1295.  
4 The submit comments button 1290 is selected by the user when the user has selected  
5 and/or entered all information associated with the comments regarding the first document  
6 object 40, the link reference 42 to the first document object 40 the user wishes to publish,  
7 and the link relationship 45 associating the two document objects. Upon selection of the  
8 submit comments button 1290, the client tool 220 closes the submit link relationship  
9 annotations dialog box 1200, transmits the comments regarding first document object 40  
10 along with the link relationship 45 to one of the one or more servers 30. The server 30  
11 then requests assignment of a unique file location to store text comments regarding the  
12 first document object 40, stores the comments regarding the first document object 40 on  
13 one of the Linkspace-hosted content units 513, 523, 533, and inserts the assigned file  
14 location (e.g., URL) for the text comments regarding the first document object 40 in the  
15 link relationship 45. The cancel button 1295 may be selected by the user to abort the  
16 creation and publication of the comments regarding the first document object 40 and the  
17 associated link relationship 45 and to close the submit link relationship annotations dialog  
18 box 1200.

19 The link section 1230 may include a first document object URL 1232 associated  
20 with the first document object 40 included in the link relationship 45 being created, where  
21 the first document object URL 1232 was captured when the submit link relationship  
22 annotation function was engaged; a plain language name field 1235; and a listing of first  
23 link reference attributes 1250 and the attribute values 1255 associated with those first link  
24 reference attributes 1250. The plain language name field 1235 may be captured when the  
25 submit link relationship annotation function was engaged and/or may be edited by the  
26 user creating the link relationship 45 and submitting comments.

27 In the embodiment shown in Figure 12, the comments section 1240 includes a  
28 plain language title field 1245; and a listing of second link reference attributes 1260 and  
29 the second attribute values 1265 associated with those second link reference attributes  
30 1260. In the example illustrated by Figure 12, the plain language title 1245 for the  
31 comments entered in the comment entry box 1270 indicate the comments concern a daily  
32 special for the "Linkspace Restaurant" indicated by the first document object 40.

33 The link relationship attributes display box 1280, as shown for the embodiment  
34 illustrated by Figure 12, includes a list of link relationship attributes 1282 accompanied

1 by a delete link relationship attribute button 1285. The link relationship attributes 1282  
2 are formed by pairs of first link reference attributes 1250 and second link reference  
3 attributes 1260 that the user publishing the first document object 40 and creating the link  
4 relationship 45 has selected to describe the nature of the link relationship 45 between the  
5 first document object 40 and the second document object 50. The delete link relationship  
6 attribute button 1285 may be used to delete a selected link relationship attribute 1282  
7 displayed in the link relationship attributes display box 1280.

8 Figure 13 is a flowchart illustrating a method 1300 according to one embodiment  
9 of the invention for publishing or making accessible a first document object 40 to users of  
10 the network 10, wherein the first document object 40 may not be previously available to  
11 users of the network 10 or may not be easily accessible. The method 1300, by which a  
12 first user may publish or create access to a first document object 40 to the network 10,  
13 initiates when a first user creates or locates a first document object 40 not previously  
14 available to other users of the network 10 (step 1310). The first user then locates a  
15 second document object 50 on the network 10 (step 1320). The first user may then create  
16 a link relationship 45 between the first document object 40 and the second document  
17 object 50 (step 1330). Once the information associated with the created link relationship  
18 45 have been selected by the first user, the first user, through the use of the client tool  
19 220, may transmit a copy of the first document object 40 to one of the one or more  
20 servers 30 (step 1335). The first user, again through the use of the client tool 220,  
21 transmits the information associated with the created link relationship 45 to a link  
22 directory 35 where the link relationship 45 is stored (step 1340).

23 If a copy of the first document object 40 has been transmitted to the server 30, the  
24 method 1300 then determines a storage location for the copy of the first document object  
25 40 on the one or more Linkspace-hosted content units 513, 523, 533 or networked content  
26 units 514, 524, 534 (step 1342). Upon determining a storage location for the copy of the  
27 first document object 40, the method 1300 assigns a network address consisting of the  
28 new network storage location to the link reference 42 representing the copy of the first  
29 document object 40 (step 1345). Assigning a network address, such as a URL, to the  
30 stored copy of the first document object 40 makes the stored copy of the first document  
31 object 40 available to users of the network 10 even though the original first document  
32 object 40 may not have been available to users of the network 10. The copy of the first  
33 document object 40 is then stored on the one or more Linkspace-hosted content units 513,

523, 533 or networked content units 514, 524, 534 at the network address assigned by the server 30 (step 1346).

The method 1300 then stores the network address for the copy of the first document object 40 in a network address field in a link reference 42 to the stored copy of the first document object 40 (step 1347). In order to make other users of the network 10 aware of the availability of the copy of the first document object 40, the method 1300 provides authorized users of the method 1300 access to link relationships 45 stored in link directories 35 based upon the document object 50 currently accessed by the user (step 1350). The method 1300 also provides authorized users of the method 1300 access to the copy of the first document object 40 stored on the one or more Linkspace-hosted content units 513, 523, 533 (step 1360).

In an alternate embodiment, the user may store the first document object on a networked content units 514, 524, 534 and then use the relate links dialog box 900 described in Figure 9 to create a link relationship to the first document object 40.

Figure 14 is one example screen view of a user interface for a target published document objects dialog box 1400. The target published document objects dialog box 1400 enables the user making the first document object 40 available to users of the network 10 to specify the characteristics of certain users of the network 10 to which the user publishing the first document object 40 wishes to have the first document object 40 made available to. The target published document objects dialog box 1400 is called up by activation of the target publish button 1182 shown in Figure 11.

The example screen view of the target published document objects dialog box 1400 includes a link directory indicator field 1410, and two sections: a targeted user characteristics section 1420 and an available user characteristics section 1460. The link directory indicator field 1410 specifies the link directory 35 in which the link relationship 45 associated with the first document object 40 the user wishes to make available will be maintained. The available user characteristics section 1460 includes one or more available user characteristics 1470, 1472, 1474 that reflect characteristics associated with users of the network 10 authorized to access link relationships 45 and link references 42, 52 maintained by the link directory 35 indicated by the link directory indicator field 1410. The user of the target published document objects dialog box 1400 may select from among the available user characteristics 1470, 1472, 1474 in order to target the publication of the first document object 40 to users for which the information in the user data store 370 contains those characteristics. The user publishing the first document

1 object 40 activates the add user characteristic button 1480 adjacent to the available user  
2 characteristic 1470, 1472, 1474 in order to select that available user characteristic 1470,  
3 1472, 1474 and add it to the targeted user characteristics section 1420.

4 The targeted user characteristics section 1420 includes one or more targeted user  
5 characteristics 1440, 1442, 1444 that have been selected and added from the available  
6 user characteristics section 1460. Each targeted user characteristic 1440, 1442, 1444  
7 includes a user characteristic name 1430 and an associated value field 1435. Each  
8 targeted user characteristic 1440, 1442, 1444 also has an update targeted user  
9 characteristics button 1450, a delete targeted user characteristic button 1452, and an add  
10 targeted characteristics value button 1456. Each value field 1441, 1443, 1445 associated  
11 with the targeted user characteristics 1440, 1442, 1444 allows the user of the target  
12 published document objects dialog box 1400 to select a value for the respective targeted  
13 user characteristics.

14 For example, the targeted user characteristics 1440 and 1442, both instances of the  
15 "State" available user characteristic 1474, have values of "VA" 1441 and "DC" 1443  
16 selected, indicating that the user wishing to publish the first document object 40 to other  
17 users of the network 10 desires to make the first document object 40 available to users in  
18 the states of Virginia and the District of Columbia. Likewise, the value "American" 1445  
19 selected for the targeted user characteristic "Cuisine Preferences" 1444 indicates that the  
20 user wishing to publish the first document object 40 to other users of the network 10  
21 desires to make the first document object 40 available and accessible to users whose  
22 cuisine preferences include American cuisine.

23 In an alternate embodiment of the method 1400, the user may wish to publish a  
24 civil defense alert, safety alert, or other broadcast message, to targeted users of the system  
25 100 who, based upon information contained in their user characteristics, may be  
26 determined to be interested in such a message. In this embodiment, the link reference 42  
27 is presented to any targeted users of such a message according to the steps of step 760 of  
28 method 700. This embodiment includes a method for broadcasting a first document  
29 object to users of the network comprising creating a link relationship between the first  
30 document object and a second document object which is any document object selected by  
31 the user; entering one or more user characteristics; comparing the entered characteristics  
32 to available user characteristics; targeting users using the comparison; and transmitting  
33 the document object to the targeted users.

1 Figure 15 is one example screen view of a user interface for a domain  
2 representation dialog box 1500. The domain representation dialog box 1500 enables a  
3 user of the network 10 who has responsibility for managing a link directory 35, a link  
4 directory administrator (not shown), to specify one or more users of the system 100 as  
5 entities responsible for the document objects 40, 50 which are stored on the network 10  
6 within a specific domain. By specifying that a user is an entity responsible for the  
7 document objects 40, 50 stored within a specific domain, user of the system 100 may be  
8 made aware that link references 42, 52 and link relationships 45 created by such a  
9 responsible user involving document object 40, 50 from the specific domain associated  
10 with the responsible user are to be considered "publisher links" as presented under the  
11 publisher links tab 1075 shown Figure 10. The ownership of first document objects 40  
12 published by using the method 1400 may be registered to the publishing user.

13 The domain representation dialog box 1500 includes a domain selection field  
14 1510, an add represented domain button 1515, a domain information section 1520, and a  
15 listing of assigned domain representatives 1560. The domain selection field 1510 allows  
16 a link directory administrator to select from a list of network domains to which  
17 representative users have been assigned responsibility. The add represented domain  
18 button 1515 allows the link directory administrator to add a network domain to the list of  
19 domains for which representative users have been assigned responsibility.

20 The listing of assigned domain representatives 1560 includes one or more  
21 usernames 1570 of users of the invention. Each listed username 1570 indicates that that  
22 user of the invention has been selected as a representative of the network domain  
23 indicated in the domain selection field 1510. The listing of assigned domain  
24 representatives 1560 also may include an add domain representative button 1565 which  
25 allows the link directory administrator to select and add users of the invention to the  
26 listing of assigned domain representatives 1560. Each listed username 1570 may also  
27 have a delete domain representative button 1575 adjacent to the listed username 1570 by  
28 which a link directory administrator may delete a listed username 1570 from the listing of  
29 assigned domain representatives 1560.

30 The domain information section 1520 includes fields permitting a link directory  
31 administrator to enter information relating to the network domain listed in the domain  
32 selection field 1510 or a new network domain being added to the list of domains for  
33 which representative users have been assigned responsibility through the add represented  
34 domain button 1515. The domain information section 1520 includes a domain name field

1 1521. The domain name field 1521 shown in Figure 15 follows the form of network  
2 domains used on the Internet. This form includes, moving from right to left, a generic  
3 top-level domain suffix ("org"), preceded by a period and then a domain name  
4 ("example"), which is also preceded by a period, and then a host computer name  
5 ("sample"). The domain information section 1520 may also include fields for  
6 organization name 1522, administrative contact name 1524, administrative contact  
7 address 1526, second administrative contact address line 1528, administrative contact city  
8 1530, administrative contact state 1532, administrative contact postal code 1534,  
9 administrative contact e-mail address 1536, administrative contact phone number 1540,  
10 and administrative contact fax number 1545.

11 At the bottom of the domain information section 1520 shown in the example  
12 domain representation dialog box 1500 of Figure 15 there may be an update domain  
13 information button 1550 and a delete domain name button 1555. The update domain  
14 information button 1550 permits a link directory administrator to update the information  
15 regarding a network domain to which representative users have been assigned  
16 responsibility with the information in the fields in the domain information section 1520.  
17 The delete domain name button 1555 deletes the network domain currently selected in the  
18 domain selection field 1510 from the list of domains for which representative users have  
19 been assigned responsibility.

20 The document objects 40, 50 managed by the method 1100 may be presented to  
21 the user accessing a document object through the link reference display window 1020  
22 shown in the example of a screen view for one embodiment of the client GUI display 225  
23 in Figure 10. Link relationships 45 between document objects 40, 50 referenced by link  
24 references 42, 52 may be presented to the user in a hierarchical listing under affinity  
25 directory headings 1081, 1082 in the link reference display window 1020. Each affinity  
26 directory heading 1081, 1082 corresponds to one of the one or more link directories 35 on  
27 a server 30. In addition, under each affinity directory heading 1081, 1082, there may be  
28 displayed one or more attribute folders 1091, 1092. Each attribute folder 1091, 1092  
29 under each affinity directory heading 1082, 1082 corresponds to one of the one or more  
30 link relationship attributes or document object attributes that the link directory  
31 administrator has defined for the corresponding link directory 35, and that the user has  
32 determined through one or more user profiles 230, 332, to be of interest to the user while  
33 viewing a document object 40 in the browser display window 1030.



1 Furthermore, each attribute folder 1091, 1092 may contain one or more listed  
2 hyperlinks 1095, 1096 drawn from the respective affinity directory headings 1081, 1082.  
3 The listed hyperlinks 1095, 1096 represent link references 52 to second document objects  
4 50 on the network 10 related to the first document object 40 in the browser display  
5 window 1030. The link references 52 enable the user to navigate to the second document  
6 objects 50 by selecting the listed hyperlinks 1095, 1096. A link reference 52 includes a  
7 pointer to the network address, or URL, of the second document 50. The URL of a  
8 document object 50 may also permit the rendering tool 210 to present or highlight a  
9 particular location in the second document object 50 upon opening the document object  
10 50 when the user selects a listed hyperlink 1095, 1096. Alternatively, the document  
11 object 50 accessed when the user selects a listed hyperlink 1095, 1096 may be generated  
12 on the network 10 at the time of selection of the listed hyperlink 1095, 1096.  
13

14 The steps of the methods 600, 700, 800 and 1300, and subsets of those steps or  
15 parts of the methods, may be implemented with hardware or by execution of programs,  
16 modules or scripts. The programs, modules or scripts may be stored or embodied on one  
17 or more computer readable mediums in a variety of formats, including source code, object  
18 code or executable code, among other formats. The computer readable mediums may  
19 include, for example, both storage devices and signals. Exemplary computer readable  
20 storage devices include conventional computer system RAM (random access memory),  
21 ROM (read only memory), EPROM (erasable, programmable ROM), EEPROM  
22 (electrically erasable, programmable ROM), and magnetic or optical disks or tapes.  
23 Exemplary computer readable signals, whether modulated using a carrier or not, are  
24 signals that a computer system hosting or running the described methods can be  
25 configured to access, including signals downloaded through the Internet or other  
26 networks.

27 The terms and descriptions used herein are set forth by way of illustration only  
28 and are not meant as limitations. Those skilled in the art will recognize that many  
29 variations are possible within the spirit and scope of the invention as defined in the  
30 following claims, and their equivalents, in which all terms are to be understood in their  
31 broadest possible sense unless otherwise indicated.